

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$	I_D $T_A = +25^\circ C$
-40V	45m Ω @ $V_{GS} = -10V$	-6.5A
	55m Ω @ $V_{GS} = -4.5V$	-5.9A

Description

This MOSFET has been designed to minimize the on-state resistance ($R_{DS(ON)}$) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

Applications

- Backlighting
- DC-DC Converters
- Power Management Functions

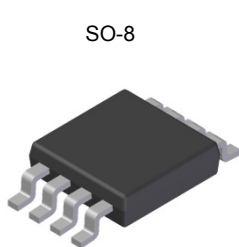
Features

- 100% Unclamped Inductive Switch (UIS) test in production
- Low on-resistance
- Fast switching speed
- **Totally Lead-Free & Fully RoHS compliant (Note 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

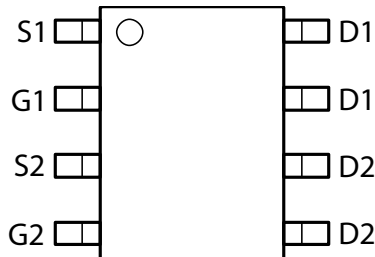
Mechanical Data

- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish – Tin Finish annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208 ⁽⁶³⁾
- Weight: 0.074 grams (approximate)

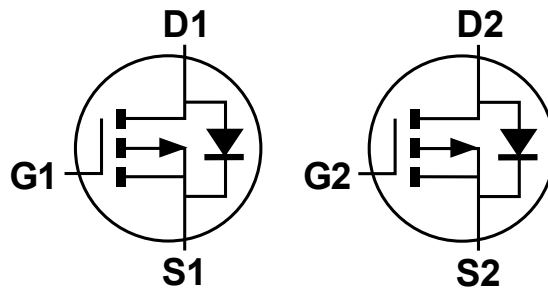
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Top View



Top View
Pin-Out



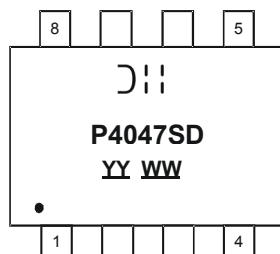
Equivalent Circuit

Ordering Information (Note 4 & 5)

Part Number	Compliance	Case	Packaging
DMP4047SSD-13	Standard	SO-8	2,500/Tape & Reel
DMP4047SSDQ-13	Automotive	SO-8	2,500/Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 2. See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to http://www.diodes.com/quality/product_grade_definitions/.
 5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



D = Manufacturer's Marking
P4047SD = Product Type Marking Code
YYWW = Date Code Marking
YY = Year (ex: 09 = 2009)
WW = Week (01 - 53)

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Units
Drain-Source Voltage		V _{DSS}	-40	V
Gate-Source Voltage		V _{GSS}	±20	V
Continuous Drain Current (Note 7) V _{GS} = -10V	Steady State	T _A = +25°C T _A = +70°C	-5.1 -4.1	A
	t < 10s	T _A = +25°C T _A = +70°C	-6.5 -5.2	A
Continuous Drain Current (Note 7) V _{GS} = -4.5V	Steady State	T _A = +25°C T _A = +70°C	-4.6 -3.7	A
	t < 10s	T _A = +25°C T _A = +70°C	-5.9 -4.7	A
Maximum Body Diode Continuous Current		I _S	-2.5	A
Pulsed Drain Current (10µs pulse, duty cycle = 1%)		I _{DM}	-40	A

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 6)	T _A = +25°C	P _D	1.3	W
	T _A = +70°C		0.8	
Thermal Resistance, Junction to Ambient (Note 6)	Steady state	R _{θJA}	98	°C/W
	t < 10s		59	
Total Power Dissipation (Note 7)	T _A = +25°C	P _D	1.8	W
	T _A = +70°C		1.1	
Thermal Resistance, Junction to Ambient (Note 7)	Steady state	R _{θJA}	71	°C/W
	t < 10s		43	
Thermal Resistance, Junction to Case (Note 7)		R _{θJC}	11.8	
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +150	°C

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV _{DSS}	-40	-	-	V	V _{GS} = 0V, I _D = -250µA
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	-	-	-1	µA	V _{DS} = -40V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	-	-	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(th)}	-1.0	-	-3.0	V	V _{DS} = V _{GS} , I _D = -250µA
Static Drain-Source On-Resistance	R _{DS(on)}	-	33	45	mΩ	V _{GS} = -10V, I _D = -4.4A
			40	55		V _{GS} = -4.5V, I _D = -3.7A
Diode Forward Voltage	V _{SD}	-	-0.75	-1.2	V	V _{GS} = 0V, I _S = -3.9A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	-	1154	-	pF	V _{DS} = -20V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	-	84	-	pF	
Reverse Transfer Capacitance	C _{rss}	-	66	-	pF	
Gate Resistance	R _G	-	12.6	-	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = -4.5V)	Q _g	-	10.6	-	nC	V _{DS} = -20V, I _D = -4.9A
Total Gate Charge (V _{GS} = -10V)	Q _g	-	21.5	-	nC	
Gate-Source Charge	Q _{gs}	-	2.2	-	nC	
Gate-Drain Charge	Q _{gd}	-	3.3	-	nC	
Turn-On Delay Time	t _{D(on)}	-	8.7	-	ns	V _{DS} = -20V, I _D = -3.9A V _{GS} = 4.5V, R _G = 1Ω
Turn-On Rise Time	t _r	-	19.6	-	ns	
Turn-Off Delay Time	t _{D(off)}	-	34.9	-	ns	
Turn-Off Fall Time	t _f	-	25.5	-	ns	
Body Diode Reverse Recovery Time	t _{rr}	-	9.61	-	ns	I _F = -3.9A, di/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q _{rr}	-	3.3	-	nC	

- Notes:
6. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 7. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
 8. Short duration pulse test used to minimize self-heating effect.
 9. Guaranteed by design. Not subject to product testing.

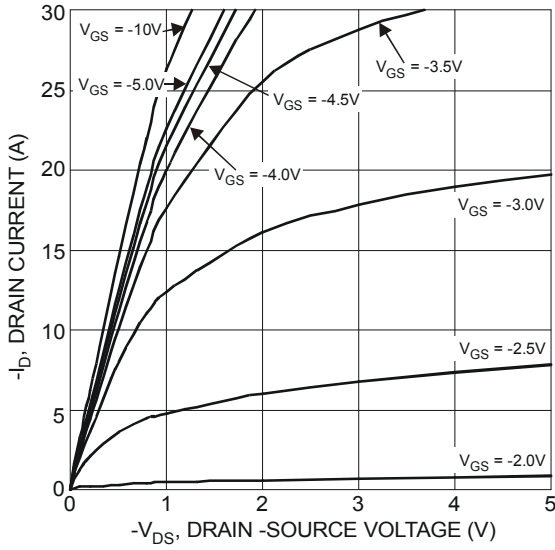


Figure 1 Typical Output Characteristics

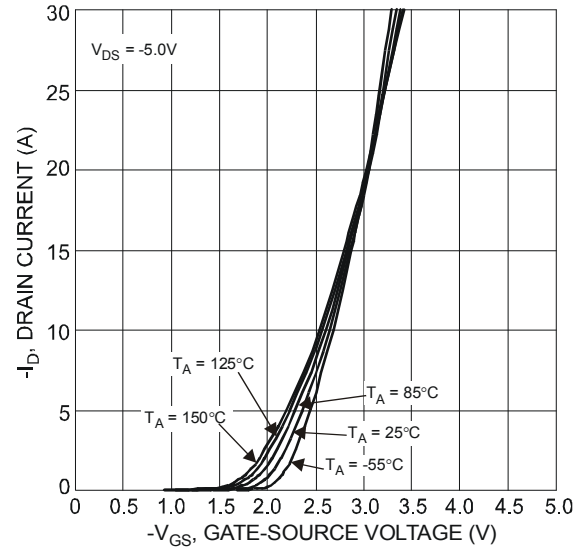


Figure 2 Typical Transfer Characteristics

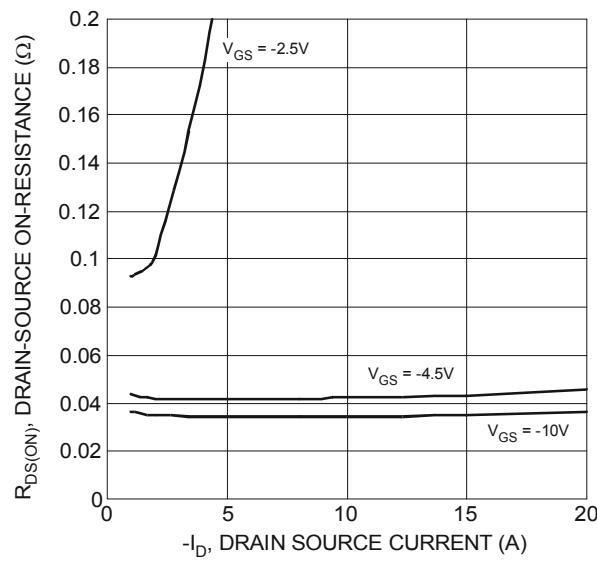


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

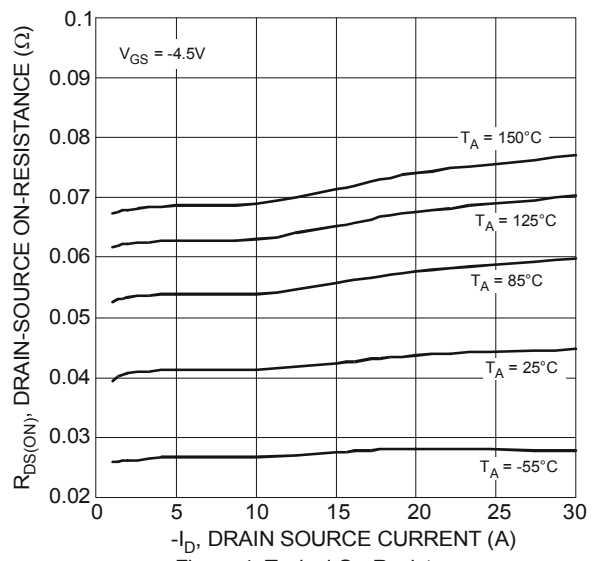


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

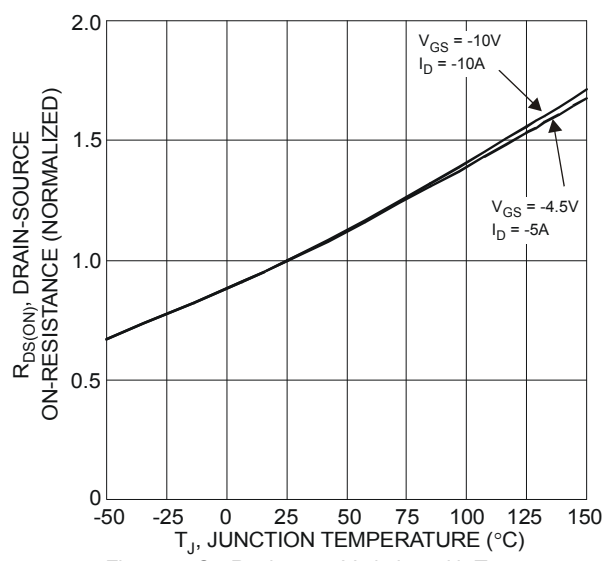


Figure 5 On-Resistance Variation with Temperature

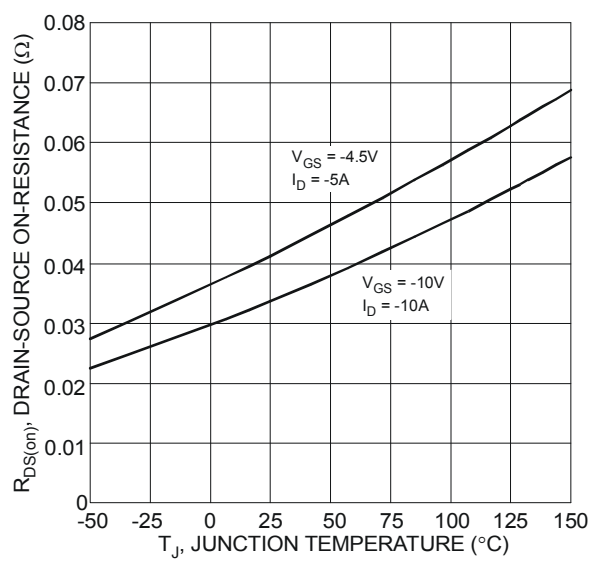


Figure 6 On-Resistance Variation with Temperature

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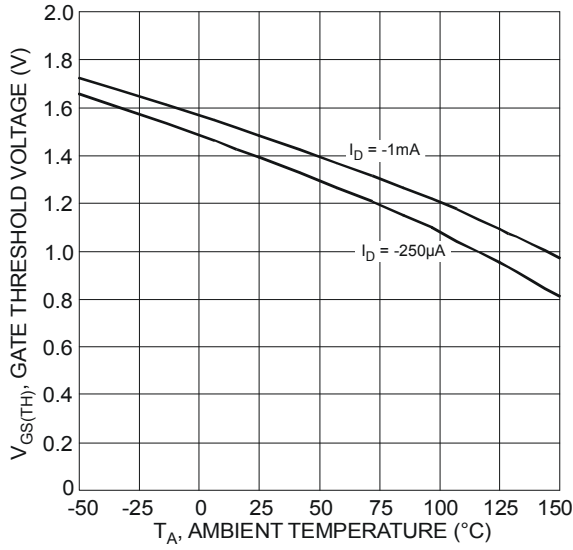


Figure 7 Gate Threshold Variation vs. Ambient Temperature

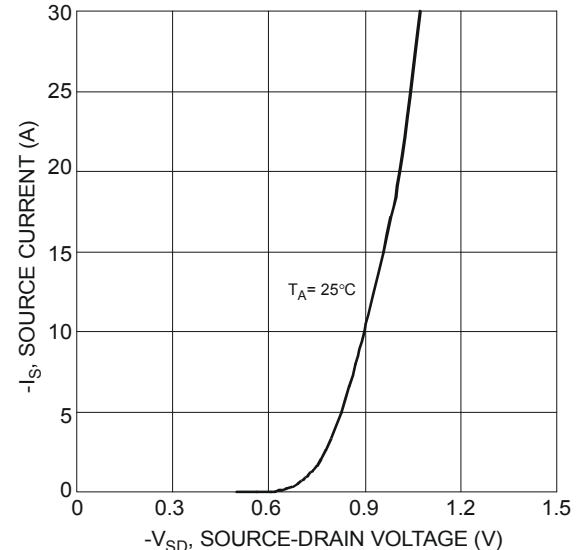


Figure 8 Diode Forward Voltage vs. Current

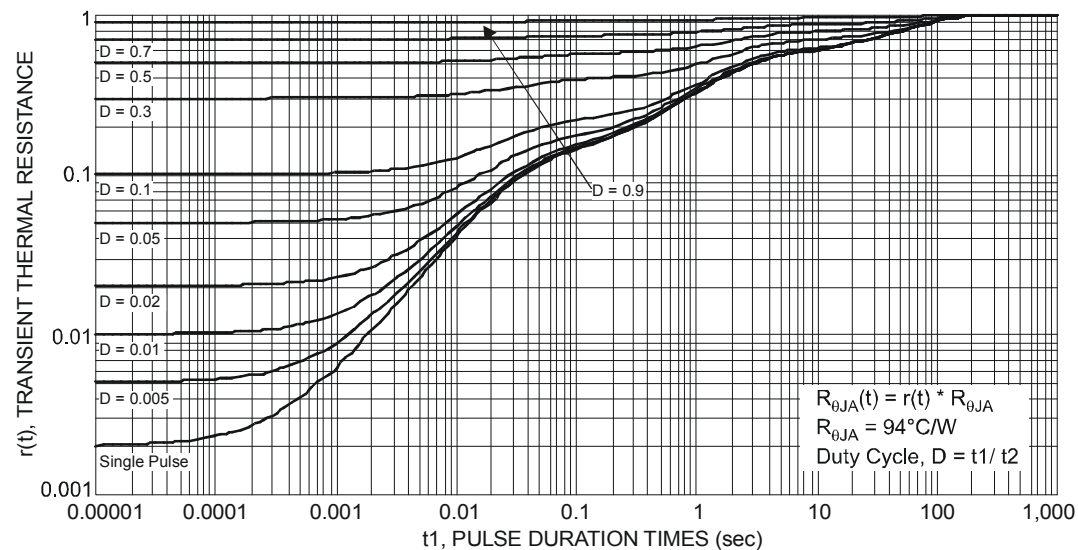
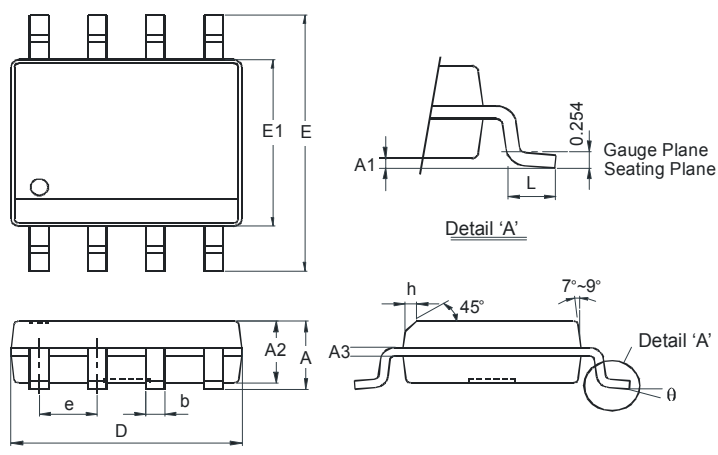


Figure 9 Transient Thermal Resistance

Package Outline Dimensions

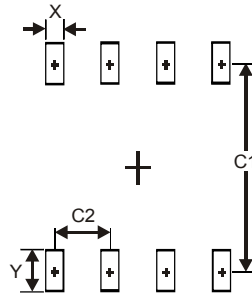
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



SO-8		
Dim	Min	Max
A	-	1.75
A1	0.10	0.20
A2	1.30	1.50
A3	0.15	0.25
b	0.3	0.5
D	4.85	4.95
E	5.90	6.10
E1	3.85	3.95
e	1.27 Typ	
h	-	0.35
L	0.62	0.82
θ	0°	8°
All Dimensions in mm		

Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



Dimensions	Value (in mm)
X	0.60
Y	1.55
C1	5.4
C2	1.27

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